

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

WHAT IS CLAIMED IS:

1. An apparatus including an interface circuit,
the apparatus comprising:

a first device including,

5 a first receive data terminal,

a first transmit data terminal,

a first power supply terminal

configured to convey a first power supply
voltage, and

10 a second power supply terminal

configured to convey a second power supply
voltage;

a second device including,

15 a third power supply terminal

configured to bear a third power supply
voltage different from the first power
supply voltage,

a fourth power supply terminal

20 configured to bear a fourth power supply
voltage different from the second power
supply voltage,

a second receive data terminal

configured to convey a received data
signal, and

25 a second transmit data terminal

configured to convey a default voltage
while the second receive data terminal
receives a data signal, the second device
interpreting the received data signal

30 traversing a receiver threshold value as a
first logic state and interpreting the
received data signal not traversing the

receiver threshold value as a second logic state opposite the first logic state, the first power supply voltage traversing the receiver threshold value;

5 a switch including a first node, a second node, and a control node, the first node in electrical communication with the first transmit data terminal, the second transmit data terminal, and the second receive data terminal, and the second node in electrical communication with the first power supply terminal, and the control node in electrical communication with the first receive data terminal,

10 wherein the switch is configured to a first state to convey the first power supply voltage to the second receive data terminal, and

15 wherein the switch is configured to a second state to convey the default voltage signal from the second transmit data terminal to the second receive data terminal, and to convey a voltage signal from the second transmit data terminal to the first receive data terminal.

20 2. The interface circuit according to claim 1 wherein:

25 the switch comprises a PMOS transistor;

the first node comprises a drain of the PMOS transistor;

the second node comprises a source of the PMOS transistor; and

30 the control node comprises a gate of the PMOS transistor.

3. The interface circuit according to claim 1
wherein:

the switch comprises a PNP bipolar transistor;

the first node comprises an emitter of the PNP
5 bipolar transistor;

the second node comprises a collector of the PNP
bipolar transistor; and

the control node comprises a base of the PNP
bipolar transistor.

10 4. The interface circuit according to claim 3
wherein:

the second device is an RS232 device having a
receiver threshold value of approximately +3V, a low
first logic state, a default voltage of -12V, a third
15 power supply terminal configured to bear a third
power supply voltage of approximately +12V, and a
fourth power supply terminal configured to bear a
fourth power supply voltage of approximately -12V.

5. The interface circuit according to claim 4
20 wherein:

the first device is a TTL microcontroller having
a first power supply terminal configured to bear a
first power supply voltage of approximately +5V and a
second power supply terminal configured to bear a
25 second power supply voltage of approximately ground.

6. The interface circuit according to claim 5
wherein the TTL microcontroller includes a pin
addressable eight-bit parallel port and a software
program instructing the microcontroller to
30 synchronize and conduct serial-to-parallel conversion

of signals communicated between the RS232 device and the TTL microcontroller.

7. A method of communicating between a first device utilizing a first logic family and a second device utilizing a second logic family different from the first logic family, the method comprising the steps of:

forming an electrical connection between a first node of a switch and a transmit data terminal of the first device;

forming an electrical connection between the first switch node and a transmit data terminal of the second device;

forming an electrical connection between the first switch node and a receive data terminal of the second device;

forming an electrical connection between a second node of the switch and a power supply of the first device;

forming an electrical connection between a control node of the switch and a receive data terminal of the first device;

transmitting a first power supply voltage from the receive data terminal of the first device to the switch control node, such that the switch is placed into a first state and a second power supply voltage is conveyed from the transmit data terminal of the second device to the transmit data terminal of the first device;

transmitting the first power supply voltage from the receive data terminal of the first device to the switch control node, such that the switch is placed

into the first state and a third power supply voltage is conveyed from the transmit data terminal of the second device to the receive data terminal of the second device; and

5 transmitting a fourth power supply voltage from the receive data pin of the first device to the switch control node, such that the switch is placed into a second state and the first power supply voltage is conveyed from the first device to the receive data pin of the second device, the second device interpreting the received first power supply voltage traversing a receiver threshold value as a 10 first logic state.

8. The method according to claim 7 wherein:

15 the step of forming an electrical connection between the first switch node and a transmit data pin of the second device comprises forming an electrical connection between the first switch node and a transmit data pin of an RS232 device;

20 the step of forming an electrical connection between the first switch node and a receive data pin comprises forming an electrical connection between the first switch node and a receive data pin of the RS232 device;

25 the step of transmitting a first power supply voltage from the receive data pin of the first device to the switch control node causes an RS232 power supply voltage of approximately -12V to be conveyed from the RS232 transmit data pin to the RS232 receive 30 data pin; and

the step of transmitting a fourth power supply voltage from the receive data pin of the first device

to the switch control node causes the first power supply voltage traversing a +3V receiver threshold value to be conveyed to the RS232 receive data pin.

9. The method according to claim 8 wherein:

5 the step of forming an electrical connection between the first switch node and a transmit data pin of the first device comprises forming an electrical connection between the first switch node and a transmit data pin of a TTL microcontroller;

10 the step of forming an electrical connection between the second switch node and the power supply comprises forming an electrical connection between the second switch node and a power supply bearing a +5V TTL microcontroller power supply voltage;

15 the step of forming an electrical connection between the switch control node and a receive data pin of the first device comprises forming an electrical connection between the switch control node and the receive data pin of the TTL microcontroller;

20 the step of transmitting a first power supply voltage from the receive data pin of the first device to the switch control node comprises transmitting a +5V TTL microcontroller power supply voltage to the switch control node to cause the +5V TTL

25 microcontroller power supply voltage to be conveyed from the RS232 transmit data pin to the receive data pin of the TTL microcontroller; and

30 the step of transmitting a fourth power supply voltage from the receive data pin of the first device to the switch control node comprises transmitting a 0V TTL microcontroller power supply voltage to the switch control node to cause the +5V TTL

microcontroller power supply voltage traversing the receiver threshold value to be conveyed to the receive data pin of the RS232 device.

10. The method according to claim 7 wherein:

5 the step of forming an electrical connection between the first switch node and a transmit data pin of the first device comprises forming an electrical connection between a collector of a PNP transistor and the transmit data pin of the first device;

10 the step of forming an electrical connection between the first switch node and a transmit data pin of the second device comprises forming an electrical connection between the PNP collector and the transmit data pin of the second device;

15 the step of forming an electrical connection between the first switch node and a receive data pin of the second device comprises forming an electrical connection between the PNP collector and the receive data pin of the second device;

20 the step of forming an electrical connection between the second switch node and a power supply of the first device comprises forming an electrical connection between an emitter of the PNP transistor and the power supply of the first device; and

25 the step of forming an electrical connection between a control node of the switch and a receive data pin of the first device comprises forming an electrical connection between a base of the PNP transistor and the receive data pin of the first device.

30

11. The method according to claim 7 wherein:
the step of forming an electrical connection
between the first switch node and a transmit data pin
of the first device comprises forming an electrical
connection between a drain of a PMOS transistor and
the transmit data pin of the first device;

5
the step of forming an electrical connection
between the first switch node and a transmit data pin
of the second device comprises forming an electrical
connection between the PMOS drain and the transmit
data pin of the second device;

10
the step of forming an electrical connection
between the first switch node and a receive data pin
of the second device comprises forming an electrical
connection between the PMOS drain and the receive
data pin of the second device;

15
the step of forming an electrical connection
between the second switch node and a power supply of
the first device comprises forming an electrical
connection between a source of the PMOS transistor
and the power supply of the first device; and

20
the step of forming an electrical connection
between a control node of the switch and a receive
data pin of the first device comprises forming an
electrical connection between a gate of the PMOS
transistor and the receive data pin of the first
device.